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(19) (CA) APPLICATION FOR CANADIAN PATENT (12)

(54) Stabilizer Ram for Parabolic Antenna

(72) Gearhart, John - Canada ;

(73) Same as inventor

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ABSTRACT

A stabilizer for a mounting structure for a parabolic antenna of the type being mounted on a base and having an actuator to adjust antenna position has arms adapted to extend and contract to permit adjustment of the length of the stabilizer to correspond with adjustment of the position of the antenna. A brake is provided for locking the arms of the stabilizer in position relative to each other. The brake is operated by an electromagnet and is engaged and disengaged by a signal from the motor used to actuate the actuator. The stabilizer is particularly useful for providing additional support to an antenna to minimize damage due to wind and to maintain the antenna in a selected position.

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STABILIZER RAM FOR PARABOLIC ANTENNA

This invention relates to a stabilizer for a parabolic antenna, the stabilizer having arms adapted to 5 extend and contract to permit adjustment of the length of the stabilizer to correspond with adjustment of the position of the antenna. The stabilizer is particularly useful for providing support to an antenna to minimize damage due to wind and to maintain the antenna in a 10 selected position.

Parabolic antennae are in increasing demand in part due to the popularity of TVRO (television receive only) systems. For the consumer a more affordable type of 15 satellite system produced essentially from lighter but more durable material has been introduced. Whereas parabolic antennae of ten years ago weighed up to five hundred pounds, the common antenna of today weighs approximately ninety pounds and by sheer weight alone 20 the tolerance of the parabolic antenna to the element is reduced. Stability is of particular importance because the movement of the parabolic antenna half an inch in either direction can severely affect signal strength resulting in poor picture quality. Undesired movement 25 due to the elements wears equipment prematurely and high cost of parts and labour in the industry makes repairs and servicing expensive.

The conventional actuator mounts on either the East 30 or West side of the antenna, depending on geographic location of the antenna, and allows the unit to effectively push the antenna to one side and pull it back. The antenna commonly mounts on a post five to 35 eight feet or more above ground level. The antenna follows a set arc determined by the location of satellites and a motor connected to or mounted on

the actuator causes the push or pull on the antenna by telescoping action of the actuator. Selection of antenna position for reception of signals from a given satellite is made by an operator at a remote location.

5 A major problem in this system is that the more the actuator is extended to a push position the less the antenna is supported and the susceptibility of the antenna to damage and repositioning by wind is increased.

10 To overcome the problem of damage and repositioning due to wind, it has been known to use bungie cords fixed at the rear of the centre mount and to the antenna to reduce stress and vibrations on the antenna. It is also known to construct the parabolic antenna out of a mesh material to permit the wind to pass through the antenna thereby minimizing the effects due to the wind. U.S. patent 4,819,007 to Tezcan, issued April 4, 1989, discloses an antenna having side arms and a main beam with cupped fastening members and swivel joints to permit movement of the antenna and is attached to the mount to permit adjustment of elevation. U.S. Patent 4,689,637 to Ochial, issued August 25, 1987, discloses an antenna and method of manufacture of an antenna which is designed to decrease deformation and damage to the parabola surface by wind by varying the thickness of the dish and providing reinforcement ribs along the edge of the antenna. To avoid wind damage it is also known to install the antenna in a wind sheltered area, however this may affect reception by obstructing the line of

20 sight of the necessary satellites.

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Despite these efforts to overcome the problem of wind damage to parabolic antennae, the problem persists. In particular the prior art does not include a secondary support structure that can be attached to an existing antenna to support the antenna and provide

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stability against the wind.

Accordingly, the structure of the present stabilizer is a support and lock for use on an existing parabolic antenna. The support is an extensible and contractible strut having a lockable and an extending and contracting condition. The strut is operably connected to the antenna and the mounting base of the antenna. The brake means is provided for selectively holding the strut in a locked condition.

In a particular aspect of the present invention, there is provided a support and lock for use on a mounting structure for an existing parabolic antenna. The support is a ram having a cylinder fixed to a conventional antenna mount and a rod attached to the antenna. The ram is pushed or pulled in the cylinder with the movement of the antenna. In addition, a brake applied to the stabilizer ram will lock the ram in place in the cylinder when the ram has been extended to the support position required by the antenna position. The brake may be actuated by a signal from the motor.

In a further particular aspect of the present invention there is provided a stabilizer for a mounting structure for a parabolic antenna of the type having an antenna mount and a motor adapted to rotate the antenna with respect to the mount. The stabilizer comprises a first arm, a second arm and brake means wherein the first arm is adapted to be fixed to the actuator, and the second arm is telescopically received in the first arm and adapted to be connected to the mount. The second arm has a proximal end where telescoping occurs and a distal end for attaching the second arm to the antenna. The brake means is adapted to lock the first and second arms in position relative to each other.

In a further particular aspect of the present invention there is provided a mounting structure for an antenna of the type to be mounted on a stationary base and to be mounted for rotation about an axis relative to the stationary base and having a stabilizing system. The stabilizing system is comprised of motor means energizable for driving said antenna about the axis; a lockable strut member being extensible and contractible, and being pivotally connected at one end to the stationary base and pivotally connected at another end to the antenna; lock means to selectively prevent extension and contraction of the lockable strut member; and means to energize the lock means on energization of the motor means. The lockable strut member is free to extend and contract on energization of the motor means and the lock and the lockable strut member is rigid when the motor means and the lock means are deenergized.

Also disclosed is a method of stabilizing a parabola antenna by attaching a stabilizer to an existing actuator mount and parabola antenna, said stabilizer comprising an extensible and contractible strut having a lockable and an extending and contracting condition. The strut is operably connected to the antenna and the base and is provided with lock means for holding the strut in a locked condition.

Also disclosed is a method for stabilizing a parabola antenna by attaching a stabilizer to an existing actuator mount and parabola antenna, said stabilizer comprising a first arm, a second arm and brake means. The first arm is adapted to be fixed to the actuator, the second arm is telescopically received in the first arm and the second arm has a distal end adapted for attaching the second arm to the antenna. The brake means is adapted to lock the first and second arms in position relative to each other. When the

stabilizer is attached to the antenna and locked in position it provides stability of the antenna against wind action.

5 The stabilizer and method of the present invention provides extra support to the antenna, reduces movement of the antenna and decreases wear on the drive arm and worm gear apparatus of the antenna.

10 In drawings which illustrate embodiments of the invention,

Figure 1 is a side elevation of the stabilizer in position attached to a parabolic antenna;

15 Figure 2 is a perspective view of the stabilizer and parabolic antenna of Figure 1;

Figure 3 is a view along antenna pivot axis -3- of Figure 2 showing the antenna and stabilizer in two positions;

20 Figure 4 is a side elevation partially in section of the stabilizer showing the brake means in disengaged position; and

Figure 5 is a side elevation partially in section of the stabilizer showing the brake means in an engaged position.

25 DETAILED DESCRIPTION

Referring to Figure 1, the stabilizer 1 is shown in position on the antenna 2, attached to the base 10 and 30 the antenna frame 40. Brake 4 is attached to the stabilizer ram 1 and is connected to motor 5 on actuator 6.

Referring to Figure 2, showing a preferred 35 embodiment, the conventional antenna 2 shown is mounted on base or post 10. The position of the antenna 2 is changed by motor means or actuator 6 which is controlled

5 by motor 5. The signal to the motor 5 to activate or energize the actuator 6 to change the position of the antenna 2 is usually given from a remote location (not shown). The motor is preferably driven by a 36V DC source. Antenna 2 has attachment ring 7a on frame 40 to which is attached stabilizer 1.

10 Support 16, pivot arm 17, frame extension 8 and brace 18 support antenna 2 and maintain it along an arc set at the time of installation or servicing and determined by the position of satellites to be tracked by the antenna 2. Pivot arm 17 allows antenna 2 to pivot on pivot axis -3-. Antenna 2 is held by frame extension 17 extending from frame cross brace 41 of frame 40 and pivotally connected to pivot arm 17 at upper point 19. Antenna 2 is also connected to frame cross brace 42 by a pivotable connection (not shown) with pivot arm 17. At its lower end, pivot arm 17 is supported by support 16 which is fixed to the top of post 10. Brace 18 may be adjusted at time of servicing or installation to provide extra support to pivot arm 17, frame extension 8 and support 16 in selected position.

25 Stabilizer 1 is installed on the parabolic antenna 2 using one of the brackets 7a,7b. Placement of the actuator 6 is determined in part by geographic location of the antenna 2. The placement and angle of the stabilizer 1 is determined by the placement and angle of the actuator 6. The stabilizer 1 does not play a role in setting the position of the antenna 2. Connecting elements 11,12 of stabilizer 1 and actuator 6 are pivotally connected by bolt 13.

30 35 Referring to Figure 3, the stabilizer 1 has two arms being cylinder 21 and ram 22. Ram 22 and cylinder 21 form an extensible and contractible strut. Cylinder

21 has closed end 24 and is hollow and receives ram 22 at opening 23. Ram 22 and cylinder 21 telescope together. Ram 22 is free to contract into cylinder 21 and extend from cylinder 21. Ram 22 is pivotally connected by eye bolt 31 and bolt 35 to bracket 7a on frame 40. Cylinder 21 is pivotally connected to bracket 14 by bracket 12 and bolt 13. Actuator 6 is pivotally connected to antenna frame 40 by eyebolt 38 of actuator ram 29 and to bracket 14 by bracket 11 and bolt 13.

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10 Bracket 14 is attached to post 10 by ring 15.

When actuator 6 is activated to move antenna 2 from left to right as shown in Figure 3, actuator ram 29 extends from actuator cylinder 28 and pushes at bracket 15 7b to move frame 40 and antenna 2 along an arc about pivot axis -3-. As antenna 2 moves, actuator 6 is pulled by antenna 2, and bracket 11b with sleeve 11a engaging cylinder 28 pivots on bolt 13 to adjust the actuator position to follow antenna 2. Activation of 20 actuator 6 causes disengagement of brake 4 and ram 22 contracts into cylinder 21. As antenna 2 moves, stabilizer ram 1 is pushed by antenna 2, and bracket 12b with sleeve 12a engaging cylinder 21 pivots on bolt 13 to adjust the actuator position to follow antenna 2.

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Referring now to Figures 4 and 5, to attach ram 22 to the antenna 2 at bracket 7, ram 22 is provided with rod end 30. Rod end 30 has eye bolt 31. Rod end 30 is pivotally connected to antenna frame 40 by nut 35, bolt 30 36 and bushing (not shown), joining eye bolt 31 and attachment ring 7.

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Brake 4 is suspended from bracket 54 and brake pad 50 is applied to hold cylinder 21 and ram 22 in position relative to each other when motor 5 is not in operation and antenna 2 is in a selected position. Brake 4 has

electromagnet 51 and brake pad 50. When electric current 56 is applied to motor 5 and electromagnet 51, actuator 6 is activated to change the position of the antenna 2 and electromagnet 51 causes brake pad 50 to

5 lift and disengage brake 4. Ram 22 is then free to slide in or out of cylinder 21. A strip 59 of a friction reducing material, such as Teflon*, is mounted on interior wall 60 of cylinder 21 to decrease friction between ram 22 and interior wall 60 of cylinder 21.

10 Brake pad 50 fits into corresponding brake opening 55 on cylinder 21 to contact ram 22 and lock cylinder 21 and ram 22 in position relative to each other. Brake pad 50 has teeth 57 which lock into position in rack 58 on ram 22. Bracket 54 for mounting electromagnet 51 is fixed

15 to cylinder 21 near opening 23 and over brake opening 55.

When actuator 6 reaches the desired extension and antenna 2 is in the desired position, electric current 56 is removed and electromagnet 51 releases brake pad 50. Brake pad 50 is pushed by spring 53 into contact with ram 22. Teeth 57 on brake pad 50 engage

20 cooperating teeth of rack 58 and lock ram 22 and cylinder 21 in relative position.

25 In use, the stabilizer 1 is attached by connecting element end bolt 13 to the antenna mount or post 10 and a rod end 30 of ram 22 to the antenna 2 at bracket 7a. Both connections are pivotal connections. The antenna 6 is also pivotally attached to the antenna mount 10 and

30 the antenna 2. The antenna 2 is attached to pivot arm 17 at pivot point 19 and a lower pivot point (not shown). When the actuator 6 extends and pushes the antenna mount 6 along an arc about pivot access -3-, the antenna 2 pushes on rod end 30 of the stabilizer 1 and

35 the stabilizer ram 22 contracts into cylinder 21.

*Trade-mark

Similarly, when the actuator 6 contracts and pulls the antenna mount 6 along an arc about pivot axis -3-, the antenna 2 pulls on rod end 30 of the stabilizer 1 and the stabilizer ram 22 extends from cylinder 21. The 5 actuator 6 and the stabilizer 1 pivot at the points of attachment to the antenna 2 and the antenna mount 10 to accommodate the changing lengths of the actuator 6 and stabilizer 1 and the changing position of the antenna 2. It will be seen that the actuator 6, the antenna 2 10 and the stabilizer 1 enclose an area forming substantially a triangle, and that the shape of the triangle is altered as the actuator 6 and the stabilizer 1 adjust in length and the positions of the antenna 2, the actuator 6 and the stabilizer 1 change.

15 Although a single preferred embodiment has been described and illustrated, the present invention is not limited to the features of these embodiments, but includes all variations and modifications within the 20 scope of the claims. In particular, it is understood that either cylinder 21 or ram 22 may be made up of multiple telescoping sections with a brake locking all sections and arms into a selected position. It is further understood that means of attaching the 25 stabilizer 1 to a parabola antenna will vary depending on the design of the antenna and it is not intended to limit the attachment means to that described and illustrated above. It is further understood that the design of the activator will depend on the actuator in use on the antenna, and need not be a powered extensible and contractible strut. It is also understood that the 30 electromagnet and motor may be driven by a variety of sources, including a 24V DC source. It is also understood that varying numbers and sizes and types of 35 friction reducing material may be mounted on the cylinder or ram to reduce friction when telescoping occurs.

THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

1. In a mounting structure for an antenna of the type to be mounted on a base and having an actuator to change the position of the antenna, a stabilizer comprising:
 - an extensible and contractible strut having a lockable and an extending and contracting condition, said extensible and contractible strut being operatively connected to the antenna and to the base, and
 - a brake means for selectively holding said extensible and contractible strut in a locked condition.
2. The stabilizer of claim 1 wherein said extensible and contractible strut comprises:
 - first arm means; and
 - second arm means;

wherein one of said arm means is operatively connected to the antenna, the other arm means is operatively connected to the base, and the first and second arm means are telescopically connected;

and wherein the brake means is adapted to selectively lock the first and second arm means in position relative to each other by engagement and disengagement of the brake means.
3. A stabilizer for a parabolic antenna of the type having an antenna mount and a motor adapted to rotate said antenna with respect to said mount, said stabilizer comprising:
 - first arm means;
 - second arm means; and
 - brake means;

wherein the first arm means is rotatably connected to the antenna, the second arm means is rotatably connected to the antenna mount, and the first arm means

and the second arm means are telescopically connected to each other;

and wherein the brake means is adapted to selectively lock the first and second arm means in position relative to each other.

4. The stabilizer of claim 2 or 3 wherein the first arm means is a cylinder and the second arm means is a ram, and the ram is free to slide into and out of the cylinder.

5. The stabilizer of claim 3 or 4 wherein the brake means comprises an electromagnet and the motor and the electromagnet are connected to a common power supply, and wherein an operator controls a signal from the power supply to cause the motor to activate the actuator and the brake means to disengage.

6. The stabilizer of claim 3 or 5 wherein the motor is driven by a 36 Volt DC power supply.

7. The stabilizer of claim 3 wherein the power supply is incorporated into the stabilizer and provides for engagement and disengagement of the brake means.

8. The stabilizer of claim 4 wherein at least one of said cylinder or said ram is provided with a friction reducing material to reduce friction between said cylinder and said ram when telescoping occurs.

9. The stabilizer of claim 4 or 5 wherein the brake is provided with teeth and the ram is provided with a rack for receiving said teeth when the brake is engaged.

10. In a mounting structure for mounting an antenna of the type to be mounted on a stationary base and to be

mounted for rotation about an axis relative to said stationary base, a stabilizing system comprising:

motor means energizable for driving said antenna about said axis;

a lockable strut member extensible and contractible, being pivotally connected at one end to said stationary base and pivotally connected at another end to said antenna;

lock means to selectively prevent extension and contraction of said lockable strut member; and

means to energize said lock means on energization of said motor means;

wherein said lockable strut member is free to extend and contract on energization of said motor means and said lock and said lockable strut member is rigid when said motor means and said lock means are deenergized.

11. The stabilizing system of claim 10 wherein said motor means is a power actuated extensible and contractible strut being pivotally connected at one end to said antenna at one side of said axis, and being pivotally connected at another end to said stationary base, said power actuated extensible and contractible strut being energizable to extend and contract.

12. A method for stabilizing a parabola antenna of the type being mounted on a base and having an actuator to change the position of the antenna, comprising:

attaching a stabilizer to the antenna and to the base, the stabilizer comprising an extensible and contractible strut having a lockable and an extending and contracting condition, and a brake means for selectively holding said extensible and contractible strut in a locked condition,

whereby the stabilizer being attached to the antenna and locked in position provides stability of the antenna against wind action.

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13. A method for stabilizing a parabola antenna comprising:

attaching a stabilizer to an existing antenna mount and parabola antenna, said stabilizer comprising first arm means, second arm means, and brake means;

wherein the first arm means is rotatably connected to the antenna, the second arm means is rotatably connected to the antenna mount, and the first arm means and the second arm means are telescopically connected to each other; and

wherein the brake means is adapted to selectively lock the first and second arm means in position relative to each other; and

whereby the stabilizer being attached to the antenna and locked in position provides stability of the antenna against wind action.

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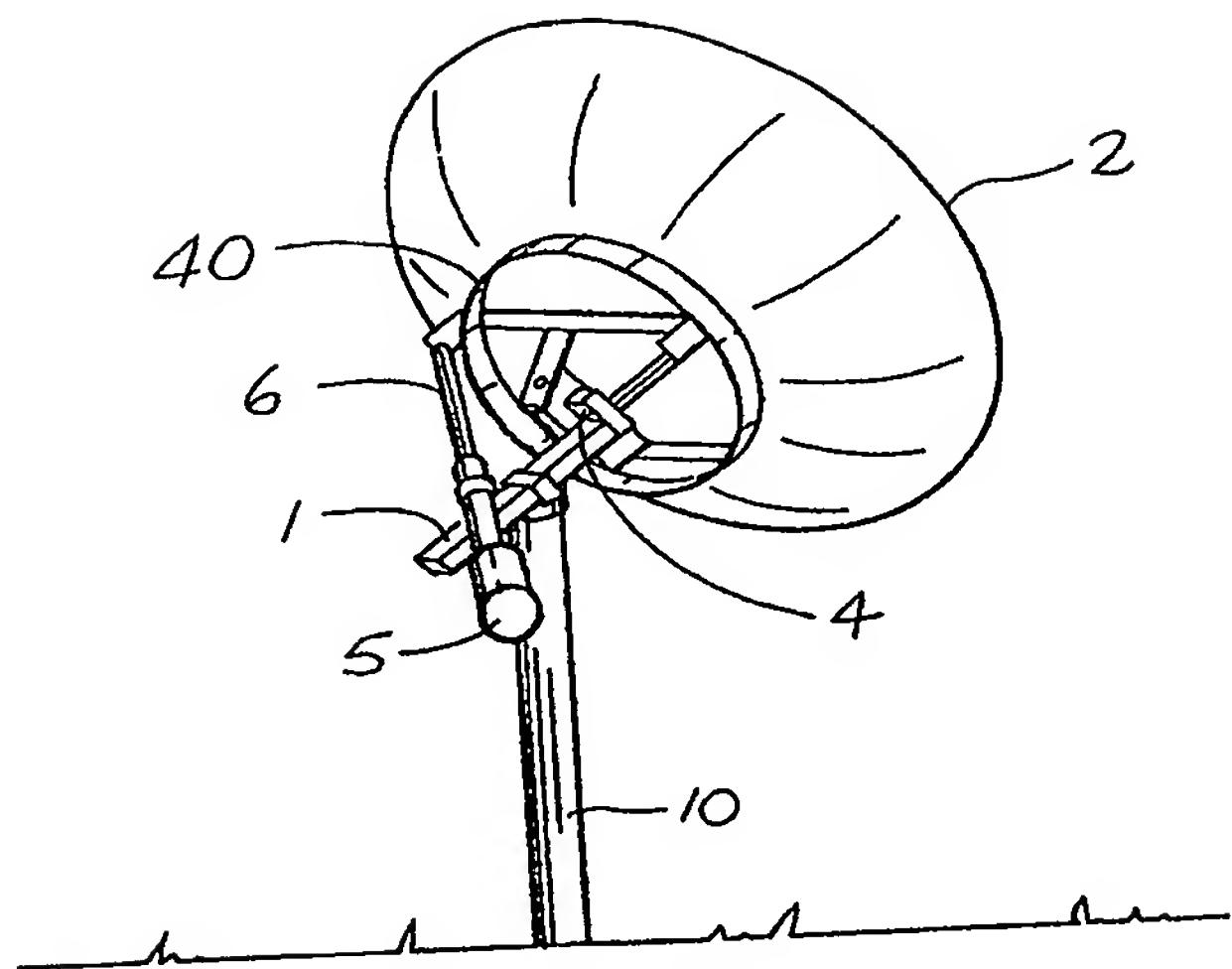


FIG. 1

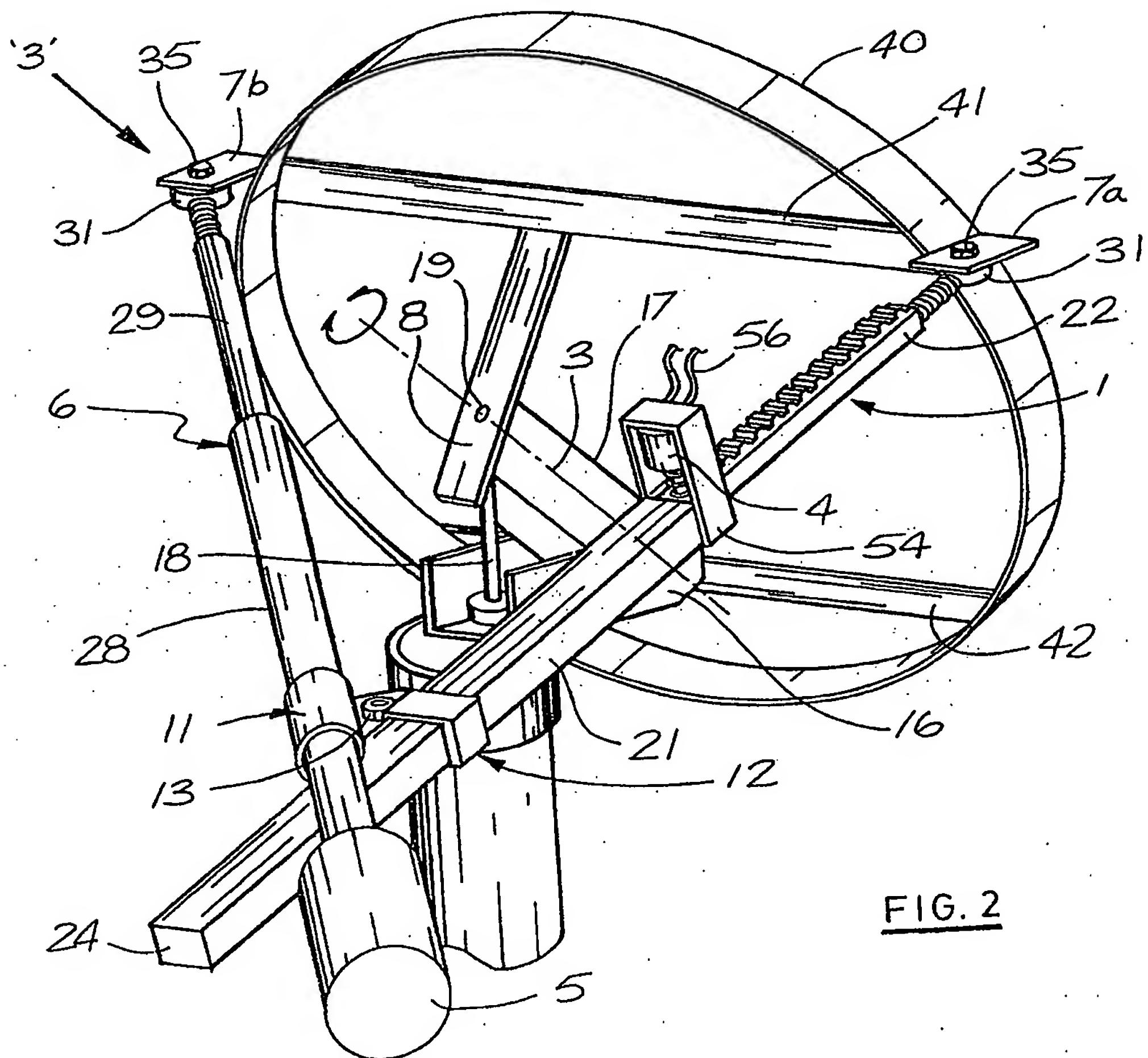


FIG. 2

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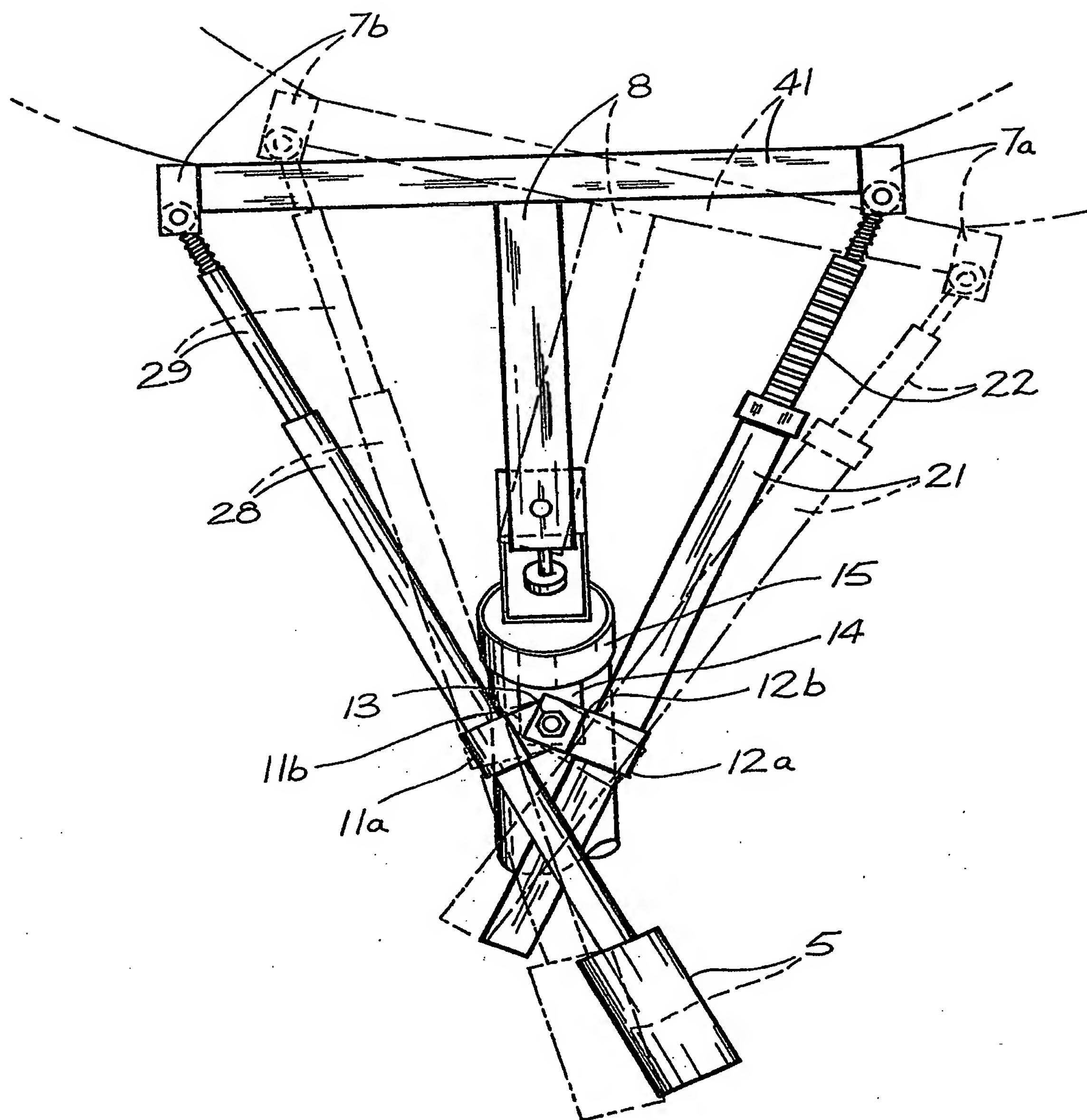


FIG. 3

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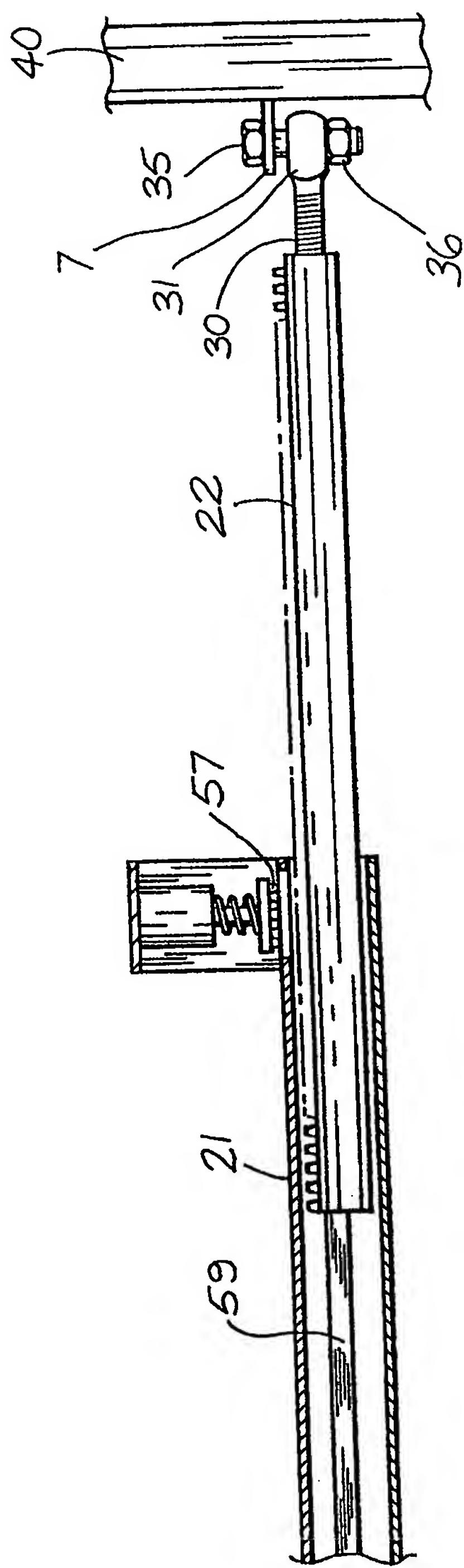


FIG. 4

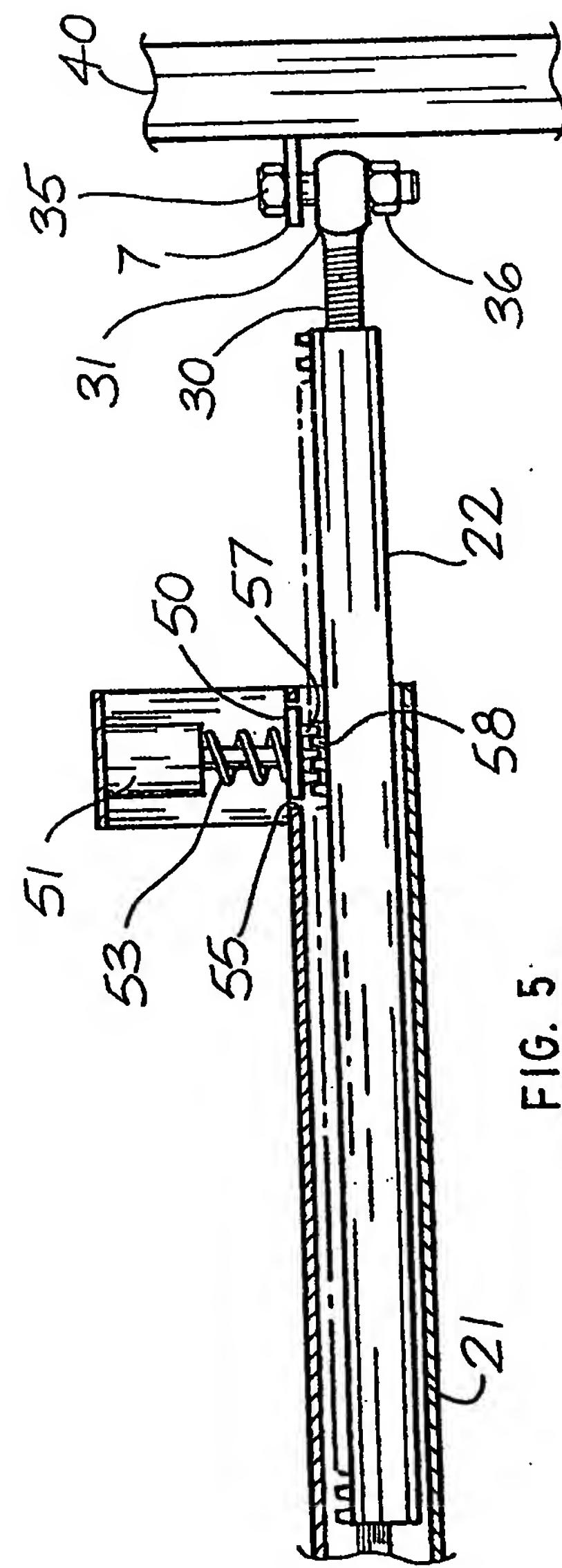


FIG. 5

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